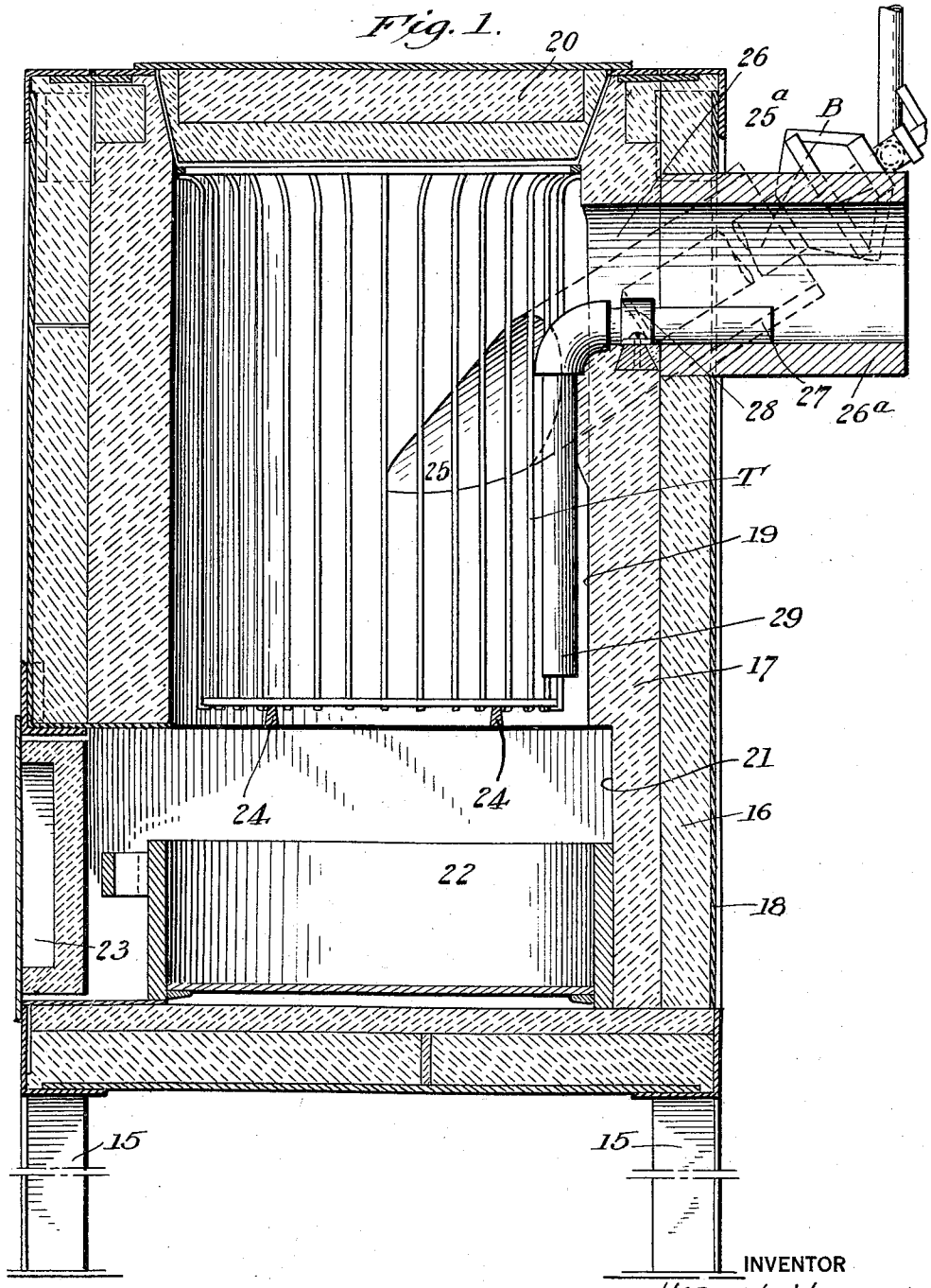
May 13, 1930. H. L. WARREN 1,758,487

DOMESTIC INCINERATOR

Filed March 21, 1927 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

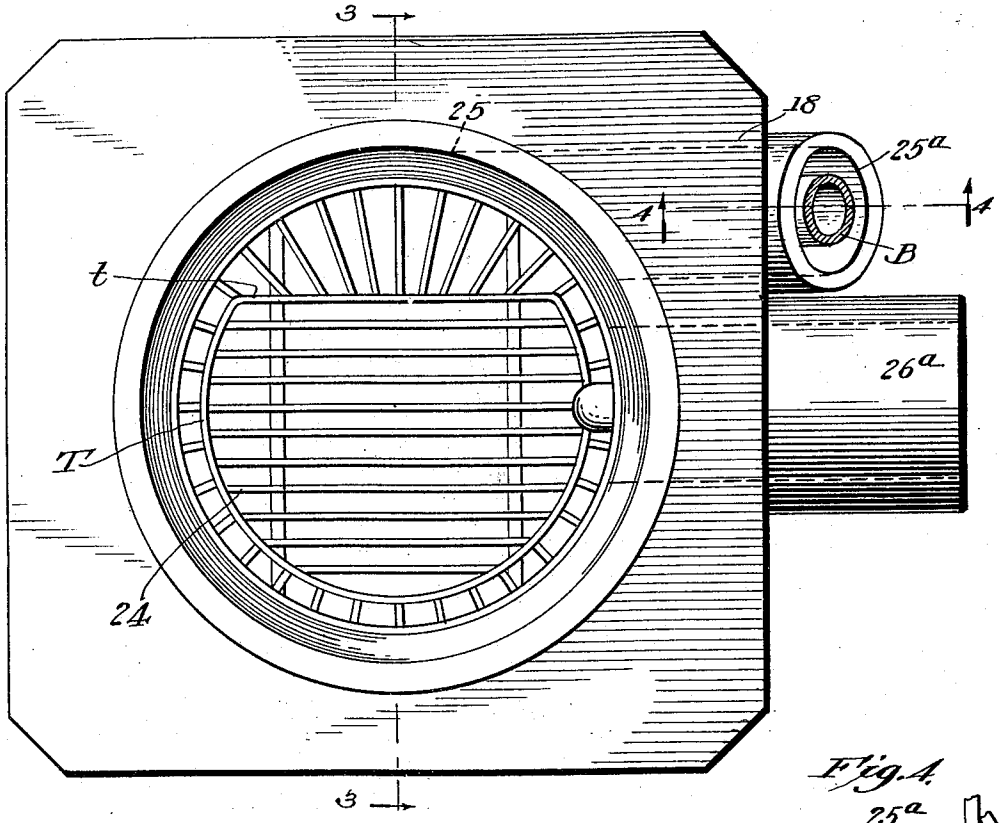


Fig. 4.

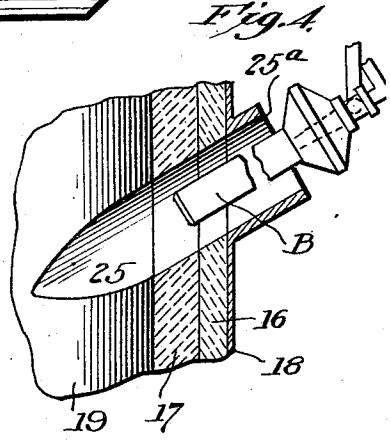
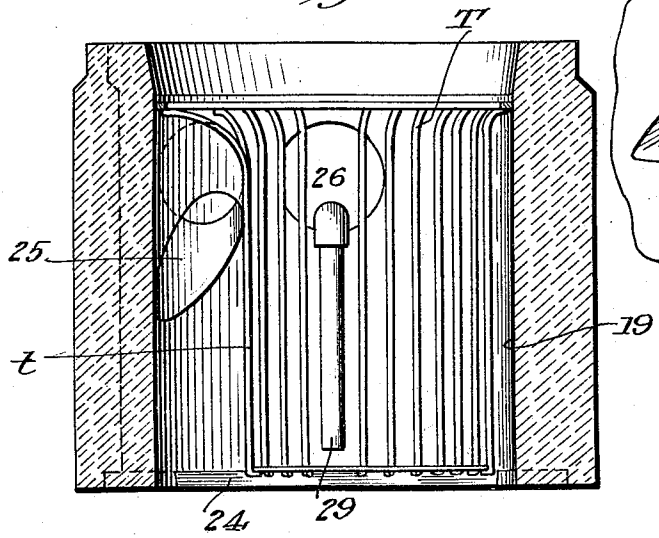


Fig. 3.



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HARRY L. WARREN, OF ALHAMBRA, CALIFORNIA

DOMESTIC INCINERATOR

Application filed March 21, 1927. Serial No. 177,115.

My invention relates to incinerators for domestic use in the consumption by burning of domestic refuse, such as garbage, paper and cloth.

It is a purpose of my invention to provide a domestic incinerator which rapidly desiccates refuse and maintains a sufficiently high stack temperature to drive off volatile moisture without recondensation in the incinerator or in the stack; provides an adequate oxygen supply and high temperature to rapidly and completely burn fats, proteins and carbohydrates without decomposition and without distillation; completely burns free carbon before it finds its way to the ash container, and all to the end of completely consuming refuse, and more particularly garbage, without appreciable odor.

My invention also involves a method of burning refuse by which the advantages just enumerated are accomplished.

I will describe only one method of and one incinerator for burning refuse, each embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawings,

Figure 1 is a view showing in vertical section one form of incinerator embodying my invention;

Figure 2 is a view showing in top plan, with the cover removed, the incinerator shown in Figure 1;

Figures 3 and 4 are sectional views taken on the lines 3—3 and 4—4, respectively, of Figure 2.

The incinerator, in its present embodiment, comprises a firebox of cubical form, preferably supported in elevated position by means of legs 15 extending downwardly from the four corners of the firebox. The firebox is constructed of heat insulating material 16 lined on its inside with a coating of highly refractory material 17 and protected on its outer side by a metal casing 18. The interior construction of the firebox is such as to provide a chamber 19 of cylindrical form, the upper end of which is open but normally closed by means of a door 20. The lower end of the chamber 19 is in communication with a sub-chamber 21 of a diameter exceeding that of the chamber 19 and in which is received an ash pan 22. Access is had to the chamber 21 through a door 23, the doors 20 and 23 being constructed of refractory material covered at their outer sides by metal sheets. The upper end of the chamber 19 is of frusto-conical form with the door 20 correspondingly shaped so as to form a substantially air-tight joint and thereby effectively close the upper end of the chamber when the door is in applied position.

At the junction of the chambers 19 and 21 are bars 24 upon which are supported a basket T formed of metal rods and adapted to contain refuse, the spacing of the rods being such as to allow free access of a flame to the refuse, both at the sides and bottom of the basket. The construction of the basket is such as to provide an annular chamber between the circular wall of the chamber 19 and the outer wall of the basket, and through this annular chamber a flame is adapted to travel in effecting consumption of the refuse contained in the basket, as will be more fully described hereinafter.

The firebox is formed with a cylindrical tunnel or opening 25 and a vent opening 26. Both of these openings are provided with pipe extensions 25^a and 26^a, respectively, the latter being adapted for connection with a chimney or stack for conducting from the incinerator oxidized gases and vapors. It is important to note that the axis of the burner tunnel is inclined at an angle of substantially 30° with respect to the horizontal and is disposed at a tangent with respect to the wall of the chamber 19. A gaseous or liquid fuel burner B of any suitable form extends into the burner tunnel, as clearly illustrated in Figure 4, and is disposed along the longitudinal axis of the tunnel, as illustrated in Figure 1. Both the tunnel and vent opening are situated adjacent the top of the firebox, with the vent opening substantially alongside of the tunnel. It is important to note the relation of the tunnel and vent opening with respect to each other and with respect to the chamber 19 as they are vital to the rapid and complete burning of refuse. In addition to the vent opening 26, which will be referred to

hereinafter as the primary vent opening, I provide a secondary vent in the form of an L-shaped pipe, the horizontal arm 27 of which is secured within the primary vent by a bracket 28 so that the vertical portion 29 depends from the primary vent opening to a point within the chamber 19 slightly above the bars 24. Both ends of the pipe are open in order to permit a draft upwardly of the vertical portion 29 into the horizontal portion 28 and from the latter to the stack.

To provide the necessary space for the proper projection of the flame emanating from the burner B into the chamber 19 in order that it may travel spirally downward about the basket T as intended, the basket is formed with a vertically disposed flattened portion *t* which entirely clears the inner end of the tunnel 25, as illustrated in Figure 2, in order that it may not interfere with the incoming current of air induced by reason of the burner and the primary vent opening 26.

The operation of the incinerator is as follows: The burner B employed is of the long flame type and when in operation projects a flame downward and tangent to the chamber wall. Owing to the velocity of the fuel or flame, a current of cold air from the atmosphere is induced into the firebox chamber. The velocity of this air current is increased by virtue of the fact that the draft of the stack connected to the primary vent opening 26, creates a suction of air through the tunnel 25 so that the draft of the stack is utilized in augmenting the velocity and volume of cold air induced. As the burner tunnel is concentric with the burner nozzle, this induced air current has a downward velocity head. Then, too, as the induced air is cold and, hence, of greater density than the gases in the firebox, this air tends to drop to the bottom of the firebox, thereby assisting the flame in its downward course around the chamber wall and basket. The flame continues to describe this spiral course until its force is spent in overcoming its frictional contact with the chamber wall when the high temperature of the products of combustion resultant from the burning refuse and the flame itself causes the flame to travel upward.

The draft of the primary vent 26 exerts a force having a vertical and horizontal component, while the secondary vent exerts a horizontal force upon the flame. These three forces, namely, the velocity head of the flame, the draft of the primary vent, and the draft of the secondary vent cause the flame to travel spirally downward along the chamber wall and then spread out under the grate as a result of the action of the draft of the secondary vent so that the sub-chamber 21 and the space between the wall of the chamber 19 and the basket T are filled with the flame. In other words, the velocity head of the combustible mixture forces the flame downward, while the wall of the chamber causes the flame to travel circularly with the result that it has a spiral downward path between the chamber wall and the basket. The primary vent exerts a vertical force, causing the flame to spread vertically and cover the chamber wall, while the secondary vent exerts a horizontal force which causes the flame to spread out under the grate and hence under the body of refuse.

If the primary vent is placed materially above the burner tunnel and low pressure gas is used, the flame will not travel as low as the grate and will short circuit to the vent. The position of the vent opening 26 above the burner tunnel and to the side thereof shown in Fig. 1, results in the flame issuing from the burner, having to travel a distance equal to approximately 300° around the circumference of the chamber 19, before arriving at a point vertically below the vent opening, so that the tendency of the natural draft of air produced by the vent opening, to prematurely draw the flame upwardly, will be eliminated, and will finally produce an upward vertical spreading of the flame when the latter has reached a point below the basket T so as to envelope the bottom of the latter as well as its sides, in a sheet of flame.

With the basket T completely or partly filled with refuse through the door 20, the radiation heat of the refractory walls, together with the heat of the enveloping flame itself, rapidly burns the refuse. The resultant gases and vapors distilled pass through a zone of high temperature and plentiful oxygen supply and are thus thoroughly oxidized before they pass through the vent openings, thus securing substantially odorless combustion.

The burnt material in the form of ash is collected in the ash pan 22 and removed through the door 23.

Providing the bars 24 are sufficiently numerous to prevent the refuse from dropping into the ash pan, it is possible to eliminate the basket T and dump refuse directly into the chamber 19 and still successfully burn the refuse without appreciable odor, although the burning is somewhat slow until the flame has burnt a circular path about the refuse corresponding substantially to the annular space between the basket and firebox wall when the flame will be free to envelope the entire body of refuse and thus proceed to rapidly and completely consume the refuse and thoroughly oxidize the resultant gases and vapors before they pass to the stack.

Although I have herein described only one method of burning refuse, and shown and described only one form of incinerator, embodying my invention, it is to be understood that various changes and modifications may be made therein without departing from the

spirit of the invention and the spirit and scope of the appended claims.

I claim as my invention:

1. An incinerator comprising a firebox having a burner opening in the wall thereof, a gaseous fuel burner in the opening positioned to direct a flame emanating therefrom downwardly in the firebox, the contour of the inner wall of the firebox and the disposition of the burner thereto being such that the flame emanating from the burner will be deflected by the inner wall and caused to travel downwardly and spirally in the firebox, a vent opening in the wall of the firebox disposed slightly above and to one side of the burner, and a pipe extending downwardly from the vent opening to a point within the firebox to cause the flame to spread at the bottom of the firebox.

2. An incinerator comprising a firebox having a burner opening in the wall thereof, a gaseous fuel burner in the opening positioned to direct a flame emanating therefrom downwardly in the firebox, the contour of the inner wall of the firebox and the disposition of the burner thereto being such that the flame emanating from the burner will be deflected by the inner wall and caused to travel downwardly and spirally in the firebox, and a vent opening in the wall of the firebox so positioned with respect to said burner that a flame emanating from the latter must travel in its downward spiral path, the major portion of the distance around the contour of the inner wall before arriving at a point vertically alined with the vent opening.

3. An incinerator comprising a firebox having a burner opening in the wall thereof, a gaseous fuel burner in the opening positioned to direct a flame emanating therefrom downwardly in the firebox, the contour of the inner wall of the firebox and the disposition of the burner thereto being such that the flame emanating from the burner will be deflected by the inner wall and caused to travel downwardly and spirally in the firebox, and a vent opening in the wall of the firebox disposed at a point slightly above and to such side of the burner nozzle that a flame emanating from the latter must travel in its downward spiral path, the major portion of the distance around the contour of the inner wall before arriving at a point vertically below the vent opening, whereby the tendency of the natural draft of air produced by the vent opening to prematurely draw the flame upwardly, will be reduced to a minimum, and will finally cause an upward vertical spreading of the flame.

4. An incinerator comprising a firebox having a cylindrical inner wall, a tunnel in the firebox communicating tangentially with the interior of the firebox and inclined downwardly, a fuel burner disposed within the tunnel, a primary vent in the firebox communicating with the interior of the firebox, a secondary vent communicating with the primary vent and with the interior of the firebox at a point below the primary vent, a basket in the firebox, and means for supporting the basket in a position spaced from the inner wall and bottom of the firebox.

5. An incinerator as embodied in claim 4 wherein said basket is provided with a vertical flattened portion adjacent the inner end of the burner tunnel for the purpose described.

6. An incinerator comprising a firebox having a burner opening in the wall thereof, a gaseous fuel burner in the opening positioned to direct a flame issuing therefrom, downwardly in the firebox, the contour of the inner wall of the firebox and the disposition of the burner thereto being such that the flame issuing from the burner will be deflected by the inner wall and caused to travel downwardly and spirally in the firebox, a primary vent in the firebox communicating with the interior of the latter, a secondary vent communicating with the primary vent and with the interior of the firebox at a point below the primary vent, a basket in the firebox, and means for supporting the basket in a position spaced from the inner wall and bottom of the firebox.

7. An incinerator comprising a firebox having a tunnel communicating with the interior of the firebox, a burner in the tunnel positioned to direct its flame against the downwardly of the inner wall of the firebox at an angle to a perpendicular and spaced from the wall of the tunnel so as to permit unheated air to be drawn into the firebox around the burner under the action of the latter and thereby assist in the downward travel of the flame, and a vent in the firebox communicating with the interior of the latter.

8. An incinerator comprising a firebox having a tunnel communicating with the interior of the firebox, a burner in the tunnel positioned to direct its flame against and downwardly of the inner wall of the firebox at an angle to a perpendicular, a primary vent in the firebox communicating with the interior of the latter, a secondary vent communicating with the primary vent and with the interior of the firebox at a point below the primary vent, and a basket in the firebox, supported in spaced relation to the inner wall and bottom of the firebox.

9. An incinerator comprising a firebox having a burner positioned to direct a flame issuing therefrom, downwardly in the firebox, the contour of the inner wall of the firebox and the disposition of the burner thereto being such that the flame from the burner will be deflected by the inner wall and caused to travel downwardly and spirally in the fire-

box, a primary vent in the firebox communicating with the interior of the latter, and a secondary vent communicating with the interior of the firebox at a point below the primary vent.

10. An incinerator comprising a firebox having a burner positioned to direct a flame issuing therefrom, downwardly in the firebox, the contour of the inner wall of the firebox and the disposition of the burner thereto being such that the flame from the burner will be deflected by the inner wall and caused to travel downwardly and spirally in the firebox, a vent in the firebox communicating with the interior of the latter, and means for overcoming the action of the vent in tending to prematurely draw the flame out of the firebox, so that the flame will be free to traverse its downward spiral path.

11. An incinerator comprising a firebox having a burner positioned to direct a flame issuing therefrom, downwardly in the firebox, the contour of the inner wall of the firebox and the disposition of the burner thereto being such that the flame from the burner will be deflected by the inner wall and caused to travel downwardly and spirally in the firebox, a vent in the firebox communicating with the interior of the latter, and means for overcoming the action of the vent in tending to prematurely draw the flame out of the firebox, and being disposed to cause spreading of the flame in the firebox.

12. An incinerator comprising a firebox having a tunnel communicating with the interior of the firebox, a burner in the tunnel positioned to direct its flame against and downwardly of the inner wall of the firebox at an angle to a perpendicular, a primary vent in the firebox communicating with the interior of the latter, and a basket in the firebox, supported in spaced relation to the inner wall and bottom of the firebox, the basket being provided with a vertical flattened portion adjacent the inner end of the burner tunnel.

HARRY L. WARREN.